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APPLICATION NUMBER: *60/349,315*
FILING DATE: *January 18, 2002*
RELATED PCT APPLICATION NUMBER: *PCT/US03/01561*

By Authority of the
COMMISSIONER OF PATENTS AND TRADEMARKS

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PTO/SB/16 (2-98)
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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53 (c).

INVENTOR(S)		
Given Name (first and middle [if any])	Family Name or Surname	Residence (City and either State or Foreign Country)
Sanjay H.	Patel	Garland, TX
Harikrushna S.	Patel	Garland, TX

☐ *Additional inventors are being named on the ___ separately numbered sheets attached hereto*

TITLE OF THE INVENTION (280 characters max)

Wireless Distribution & Collection System

CORRESPONDENCE ADDRESS

Direct all correspondence to:

☐ Customer Number → *Type Customer Number here*

OR

Place Customer Number Bar Code Label here

☐ Firm or Individual Name	Sanjay H. Patel				
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Address					
City	Garland	State	TX	ZIP	75043
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ENCLOSED APPLICATION PARTS *(check all that apply)*

- [X] Specification *Number of Pages* ____
- [X] Drawing(s) *Number of Sheets* ____
- [X] Small Entity Statement
- [ ] Other (specify) ____

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT *(check one)*

- [X] A check or money order is enclosed to cover the filing fees
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FILING FEE AMOUNT ($): 75.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

- [ ] No.
- [ ] Yes, the name of the U.S. Government agency and the Government contract number are: ____

Respectfully submitted,

SIGNATURE S.H.Patel

TYPED or PRINTED NAME Sanjay H. Patel

TELEPHONE 972-686-5551

Date 01/16/02

REGISTRATION NO. *(if appropriate)* ____

Docket Number: ____

USE ONLY FOR FILING A PROVISIONAL APPLICATION FOR PATENT

PTO/SB/17 (6/99)
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TOTAL AMOUNT OF PAYMENT ($)

Complete if Known	
Application Number	
Filing Date	01-16-2002
First Named Inventor	Sanjay H. Patel
Examiner Name	
Group / Art Unit	
Attorney Docket No.	

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FEE CALCULATION

1. BASIC FILING FEE

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
101	760	201	380	Utility filing fee	
106	310	206	155	Design filing fee	
107	480	207	240	Plant filing fee	
108	760	208	380	Reissue filing fee	
114	150	214	75	Provisional filing fee	75

SUBTOTAL (1) ($) 75.00

2. EXTRA CLAIM FEES

	Extra Claims		Fee from below	Fee Paid
Total Claims	____ -20** =	____	X ____	= ____
Independent Claims	____ - 3** =	____	X ____	= ____
Multiple Dependent			____	= ____

***or number previously paid, if greater; For Reissues, see below*

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description
103	18	203	9	Claims in excess of 20
102	78	202	39	Independent claims in excess of 3
104	260	204	130	Multiple dependent claim, if not paid
109	78	209	39	** Reissue independent claims over original patent
110	18	210	9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) ($)

FEE CALCULATION (continued)

3. ADDITIONAL FEES

Large Entity Fee Code	Large Entity Fee ($)	Small Entity Fee Code	Small Entity Fee ($)	Fee Description	Fee Paid
105	130	205	65	Surcharge - late filing fee or oath	
127	50	227	25	Surcharge - late provisional filing fee or cover sheet.	
139	130	139	130	Non-English specification	
147	2,520	147	2,520	For filing a request for reexamination	
112	920*	112	920*	Requesting publication of SIR prior to Examiner action	
113	1,840*	113	1,840*	Requesting publication of SIR after Examiner action	
115	110	215	55	Extension for reply within first month	
116	380	216	190	Extension for reply within second month	
117	870	217	435	Extension for reply within third month	
118	1,360	218	680	Extension for reply within fourth month	
128	1,850	228	925	Extension for reply within fifth month	
119	300	219	150	Notice of Appeal	
120	300	220	150	Filing a brief in support of an appeal	
121	260	221	130	Request for oral hearing	
138	1,510	138	1,510	Petition to institute a public use proceeding	
140	110	240	55	Petition to revive - unavoidable	
141	1,210	241	605	Petition to revive - unintentional	
142	1,210	242	605	Utility issue fee (or reissue)	
143	430	243	215	Design issue fee	
144	580	244	290	Plant issue fee	
122	130	122	130	Petitions to the Commissioner	
123	50	123	50	Petitions related to provisional applications	
126	240	126	240	Submission of Information Disclosure Stmt	
581	40	581	40	Recording each patent assignment per property (times number of properties)	
146	760	246	380	Filing a submission after final rejection (37 CFR § 1.129(a))	
149	760	249	380	For each additional invention to be examined (37 CFR § 1.129(b))	

Other fee (specify) _____

Other fee (specify) _____

* Reduced by Basic Filing Fee Paid

SUBTOTAL (3) ($)

SUBMITTED BY				Complete (if applicable)	
Name (Print/Type)	Sanjay H. Patel	Registration No. (Attorney/Agent)		Telephone	972-686-5551
Signature	SHPatel			Date	01-16-2002

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Provisional Patent Application of

Sanjay H. Patel

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Both Citizens of the United States of America

SPECIFICATION

TITLE OF INVENTION

WIRELESS DISTRIBUTION & COLLECTION SYSTEM

CROSS-REFERENCE TO RELATED APPLICATION

Title of Invention: [1] Internet Broadcast System (60/292946); and, [2] Data Routing System for Internet Broadcast System (60/292940).

Reference: Provisional Patent Applications Dated 05/24/2001

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

REFERENCE TO A MICROFICHE APPENDIX

Not Applicable

BACKGROUND OF THE INVENTION

This invention relates to Wireless System that provides Bi-Directional RF (Radio Frequency) Link to Customer premise equipment more commonly known as CPE from one central location commonly known as Hub or CO. Once the link is established the CPE can communicate, transmit and receive the voice, video, and data over microwave link. The most suitable application is to

Provide the Internet Connection, connect two or more corporate and or educational Local Area Networks, on campus building-to-building connections, indoor wireless connection between two or more computers or between two or more TV sets, etc.

In our last application we established a way to establish a One-way wireless link between the CPE and the hub. That link works in similar fashion as the consumer gets TV reception from the satellite over microwave link and request movie on demand via telephone line.

In this application, we like to define the RF Return Path over microwave links from CPE to the Hub, in which, multiple users will transmit to one or more hub. The hub receives the request and sends information via Internet Broadcast System's one-way link.

A broadband broadcasting system which can be utilized in audio, video and data is desired for many applications. For example, this type of system will be extremely useful for wireless connection in the Inter-Intra Networking Industry.

Today, the Internet and World Wide Web (WWW) are the most dynamic area of growth in the internetworking industry. Relative to computer industry's time line, the Internet has been around for ages, but the privatization of the Internet and the proliferation of the WWW has accelerated growth at a rate greater than even the most optimistic prediction.

The amount of data being transmitted over the Internet is becoming enormous in size and rich in multimedia content. The size of the web pages & offered programs are getting so big that it takes for ever to download or display it using dial-up connection, which is the method used by most of the Internet users. People are in need of speed to accomplish their task on the Internet in reasonable time. The Internet Industry is always coming up with new ideas and methods to provide high speed Internet Connectivity, some of the methods, which are becoming popular currently are ISDN, DSL, CABLE and last but not least wireless.

Most vendors providing wireless access are using a spread spectrum radios for point to point or in some cases point to multipoint. Spread spectrum radios provide the Internet connectivity on direct connection method. It has limited channel, which can serve limited people and the speed is

ivided among the people connected to the radio. That means if the radios is connected to T1 (1.54 Mbps) than this speed will be divided among the people using it. If we connect the radio to its full capacity (254 users), each customer will get less than dial-up modem speed. This method is mainly for a businessperson because of it's cost.

There exist a demand for faster speed at reasonable cost. Most methods on market are developed for the businesses. It is not cost effective for the home users. Some of the methods, which use telephone wires or cables, such as DSL or Cable Modems, are cost effective but it is not available in all areas. This invention provides the solution for faster speed, at affordable cost, and it can be deployed in short time. One system can serve large metroplex area without limitation on distance, like DSL has. Users need to be within 18000 feet of the Telco's switching point to get faster DSL, but not in this system. With proper setup of Transposer, repeaters and HUB, our system can serve 7850 square mile area that is good enough to serve USA's largest city & it's suburbs.

BRIEF SUMMARY OF INVENTION:

This invention is directed towards establishing the RF Bi-directional Wireless Link to the end users from the central location on which they can exchange voice, video and data along with the Internet access from the personal computers, the network of computers and/or from their television sets.

The end user uses Internet Broadcast System (IBS) to receive the downlink and the current invention that is RF Return Path System (RPS) for the up-link. RPS can be used with any other method of downlink connections, such as other wireless, satellite, cable and DSL.

RPS utilizes CPE that includes the antenna, up-converter and encoder/modulator system (EMS) and at Hub it utilizes antenna, down-converter and de-coder/de-modulator system (DCDMS). RPS utilizes special software that allows RPS to receive signal from multiple users using one frequency and sending data packets at different time interval. It is similar to time division multiplexing but not the same because the current invention utilizes the Time Delay Sorting & Multiplexing Access Method (TDSMA). Plus the software stack routes the data from CPE to the

Hub and from hub to the Inter/intranet and to the CPE on a complete wireless link.

If the user request the information stored on the hub, than it will be delivered to the user from local servers without going to the Internet on IBS Downlink.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF DRAWING

Fig. 1 is the perspective view of the Internet Broadcast System (IBS).

Fig. 2 is the perspective view of the RF Return Path System.

Fig 2-1 is a perspective view of Hub

Fig 2-2 is a perspective view of User (CPE)

Fig. 3 is the functional view of the Distribution System (DS).

Fig. 4 is the functional view of the Collection System (CS).

Fig. 5 is the perspective view of repeaters for DS & CS.

Fig. 6 is the perspective view of Distributor & Collector.

Fig 7 is a functional view of the Router, DS and CS.

DETAILED DESCRIPTION OF THE INVENTION

Figure #1 is the perspective view of the Internet Broadcast System. It provides the general overview of the Internet Broadcast System (IBS). User1 or User 2 connects to the Hub using any TCP/IP connection. When Hub receives the Request For the Information (RFI) from the User1, it retrieves the information from the Internet, Intranet or local network using two proxy servers and broadcast the retrieved information using Gateway, Modulator, Transmitter and Antenna to the User1. User1 receives the information using: dish antenna; receive card; and, computer. The downlink speed can exceed 1.54 Mbps on a regular dialup uplink connection. Figure 2 provides functional & perspective view of the Wireless Distribution & Collection System (WDCS). Figure 2-1 presents the functional view of a Hub used to collect and distribute audio, video and data from the end users. Figure 2-2 presents the functional view of the end user's site that receives and sends information to Hub using CPE.

Figure 2-1 [1] is the interface between the out side world and the Router [2]. The Interface

odule [1] is made to accept the information at Four T1 (Figure 7 [1-1]), or at T3 or OC3 (Figure 7 [1-2] in North American Standards. In European Standards this can be DS1, DS3 and OC3. All internal routing is handle by the Router [2] at 12.6 Giga Bits Per Second (Gbps) or higher. Router 2 has 12 input-output interfaces each providing 1 Gbps access. The front Panel of Router [2] Figure #7 shows 12 fire-wire interfaces, status lighting, switch, speed meter and other information. The back of router [2] will have Input interface, test ports and management ports. Router [2] is a special router designed for current invention. It has ability to use 4 T1 independently, do the load balancing and/or combine one or all four T1 to be used as one big pipe. It also can receive T3 or OC3 interface. All 12 input/output ports allow users to manage the functions of each port.

Interface Module [1] Figure #1 connects to corporate network and is a carrier class module that can accommodate PSTN, Internet, Frame-relay, ATM, and Private Network's traffic. The Router (2) connects Uplink to Port 12 and Downlink on Port 1. The uplink can be any system that sends information to the end users at high-speed such as Internet Broadcast System, Satellite and Cable System. Satellite and Cable industry faces big challenge on downlink portion that receives information from users. Most of the cable systems are created for sending information to the end users and it's not designed to receive the information from the users so it costs lots off money to upgrade this system. The current invention allows the cable network operators to easily deploy and allow users to send information at higher speed as well.

During our current discussion we will discuss only Internet Broadcast System (IBS) as an uplink system. IBS (Uplink [3] Figure 2-1 and Figure -3) sends information towards the users using IP Data Gateway [19], Modulator [20], up-converter [4], and Antenna [5]. IBS utilizes MPEG2 (soon to be MPEG4)/DVB and QPSK modulation technology. IBS' up-converter [4] and Antenna [5] works at any frequency between 2 to 40 GHz spectrums. The gateway and modulator can achieve 240 Mbps speed.

Figure 2-2 shows the customer end equipment (CPE). CPE consists of Antenna (6), up-converter (14), Down-converter (7), modulator (13), Demodulator (8), Router (9), POTS Gateway

11) with Foreign Exchange Station (FXS) interface and FXS Phone (12) and Computer (10). The user can receive signal on Television sets as well if they want to.

General function of the WDCS system can be described as follows, Figure #2: User computer (10) sends RFl packets using router, modulator, up-converter and antenna. The Hub receives it directly or through Return Path System Repeater (RPSR) via antenna (5), down converts it using down-converter (16) and sorts and multiplex it using Return Path System's Sorter-Multiplexer (SM) (17). The TCP/IP packets coming out of SM (17) is sent to the Internet via Router (2) and Interface module (1).

The router (2) has a software stack that determines the fate of the incoming information. It provides the handshake and firm link between the user and hub. It routes the data to and from the Internet, PSTN, or Private Networks. It routes the data from Local network to the users using specified uplink (3).

When the requested information reaches the Router (2), it sends it to the user using uplink (3), up-converter (4), antenna (5), antenna (6) at users location, down-converter (7), demodulator (8) that also decodes it down to TCP/IP packets, Router (9) and to end users computer or phone or TV.

Figure 3 presents the perspective and functional view of the Internet Broadcast System's Repeater (IBSR 25-1 or 2), Distributor (22, 23) and end users in coverage areas 22, 23, 24. The end users can receive the information directly from the antenna (5) area 22, or from the Distributor 22 area 22, or via IBSR 25-1 directly or through distributor 23 areas 23, or via IBSR 25-1, IBSR 25-2 in area 24. As per the current invention the user can subscribe to receive high-speed downloads and they may use regular dialup for upload. This system's best application is in delivering movies on demand, distance-learning classes' delivery, and delivering media rich content from application service providers. In these applications the user doesn't need high speed return path.

Figure 4 provides the collection system or Return Path at high-speed and via wireless link. The collectors in area 30, 31, and 32 collects the information from the users in its relevant areas and send it to the hub via antenna 5, or Return Path System Repeaters (RPSR 15-1, 2). The Hub receives

millions of packets per second on carrier microwave. It down converts the signal using down-converter (16) and sends it to the Sorter/Multiplexer (17) that demodulates and decodes the packets to be sent to the Internet or on local area network.

Figure #5 provides detailed information about the repeaters that is used in the current invention. The Internet Broadcast System Repeaters (IBSR 25-1 detailed view (34)) are the Transposer that receives the incoming carrier wave on antenna (33) at frequency F1 and changes frequency to F2 and transmit it towards the user or the Distributor (37) using antenna (35).

Return Path System Repeaters (RPSR 15-1 detailed view (36) receives the carrier wave at frequency F3 from the end users or from the collectors (38) changes frequency to F4 and transmit it towards the Hub or another repeater using antenna (33).

IBSR and RPSR can be mounted on same pole or on different pole. The configuration of the location of the IBSR and RPSR can be selected to fit the need of the population.

Figure #6 provides detailed description of the Distributor (22, 37) and Collectors (30, 38). They can be mounted close to the housing & business units. They are low powered frequency transposers. Distributor (37) receives the carrier wave from the Hub or IBSR using antenna (33) at frequency F5 changes it to F6 and transmit it towards the users using antenna (35). The collectors collect the information from the users using antenna (35) at frequency F7 converts it to F8 and transmit it towards Hub or RPSR (36) using antenna (33).

The end users can use either path of their choice if they have one path via other system. Users can use only IBS to receive the high-speed content and send information on any other existing connection. Or, users can use only Return Path System to send the high-speed content to Hub and use Cable or Satellite system to receive the high-speed content. Or user may use both IBS and RPS. .

The current invention provides the flexibility of repeating outgoing and incoming wireless link separately. Now the Hub can broadcast the high-speed content using DVB/MPEG technology to a distance exceeding 25 miles that can be extended another 25 miles using IBSR. The Hub can retrieve the high-speed content from the users using Collectors (at low power) that are located closely

the users that will send the information to RPSR and RPSR will send it to the Hub. Thus the area of coverage can be increased ten to twenty folds than any other existing wireless system. The existing wireless system uses transceivers that sends and receives signal from same radio and covers very limited area. The radio requires Internet connection at each location while in the current invention the repeaters, collectors or distributors don't require it but only at main hub.

The spread spectrum radio uses either frequency hopping or direct sequence spread spectrum technology that consumes more bandwidth in system and serves only 25 people at 57.6 Kbps on T1 (1.54 Mbps) radio that has range of less than 5 miles.

While this current invention allows Hub to serve as many people as it wants to at speed exceeding 1.54 Mbps because it is a multicast type system that delivers content at 60 to 100 Mbps to each users and receives the content at speed exceeding 6 Mbps from each users. The current inventions routers work at 12.6 Giga bit per second that can handle any number of people that can be scalable to 50,000 or more users per each Hub. Cashing the content, providing content directly from hub or on VPN connection, etc, maximizes the Internet bandwidth utilization. The network can deliver voice lines using PSTN network and gateways.

Figure 7 provides detailed view of the Interface Module (1), Router (2), and Return Path System's Sorter/Multiplexer (SM) (17) SM is specially designed to accommodate the current invention's return path. In its standard format, each SM will support 2000 users. The SM module will have 20 cards (28), each handling 100 users incoming high-speed data packets. The SM module's will demodulate & decode the data and than assigns it in to a specific time slot for one user. The next user's data will go through next time slot. The time cycle of the particular module will be divided in to millionth of a seconds and than each time slot will be used for processing the data for individual users logged on to the system. The system used in the module is similar but not same as Time Division Multiplexing. Instead it is a Time Delay Sorting & Multiplexing method (TDS&M). The current invention utilizes the principle of the mathematics that suggests that two packets cannot arrive at exact same time. This will allow each user to transmit at same frequency and configuration

CPE will be immaterial to the Hub. In existing Spread Spectrum Radios the Transmitter and Receiver, both, has to change the frequency at same time. Both radios have to be synchronized otherwise the system will not work.

ABSTRACT OF THE DISCLOSURE

The current invention, Wireless Distributor & Collection System (WDCS) provides wireless microwave links to the users from central location called hub that is connected to the Internet, PSTN and private networks. There exists many other wireless systems that accomplish this task but none of them can accomplish it more efficiently and economically as the current invention, WDCS that utilizes two separate paths: one for the uplink (IBS); and, second for the downlink (RPS).

The First path, Internet Broadcast System (IBS) that is the uplink portion of the WDCS utilizes the well proven satellite technology to broadcast the voice, video and data at more than 100 Mbps, using Omni Directional Antenna, towards users in a multicast type method and the user receives, decodes & demodulate the signal using customer premise equipment (CPE) at more than 6 Mbps. IBS is a one-way microwave uplink that provides download-side of the user's connection. The user may use return path of their choice such as dialup or ISDN. The users may realize more than 1.54 Mbps throughput on a regular dialup return path. IBS' hub can be expanded to accommodate more than 50,000 users and provide coverage to the area encompassed by more than 50-mile radius using repeaters & distributors. IBS' repeaters and distributors don't require a connection to the Internet; PSTN, or private networks. IBS' hub can be expanded to transmit at 100 Mbps per sector using 45 degree, 60 degree, 90, or 180 degree sectors that will provide a throughput of 800, 600, 400, or 200 Mbps per Hub respectively.

The second part, Return Path System (RPS) is the downlink portion of the WDCS that collects the information from the users and sends it to the Hub. The smallest unit of this portion is the collector that is a simple frequency Transposer. User's CPE that includes the Modulator, Up-converter and Antenna sends user's files to the collector at low power level approved by FCC. The collector receives the information at one frequency and sends it to the Hub or repeater at other

requency. The collector encompasses the smaller perimeter such as 3 to 5 mile radius and it is very inexpensive to deploy. The real important function of the collector is to send the signal to the hub that is located as far as 20 to 50 miles using repeaters as needed. The users modulator will operate at speed exceeding 10 Mbps using 6 Mhz or smaller bandwidth. All users will send the signal at same or different frequencies that will reach Hub at different times. The RPS' Sorter/Multiplexer (SM) utilizes the Time Delay Multiple Access not a Time Division Multiple Access but similar to it to sort all of the packets coming to it and assigns a particular time slot to it. Each SM can handle up to 2000 users. Hub can be expanded to accommodate any number of users by adding more SM.

The Router that combines IBS and RPS is the heart of the WDCS. It operates at 12.6 Gbps and routes all of the information going through it to and from the equipment connected to it. It allows IBS and RPS to work independently or with each other. If IBS is used independently it allows the users to send information on any method of their choice such as dialup or ISDN and receive the download at extremely high-speed. RPS can be used with any other system that provides faster downloads but has problem providing faster uploads such as Cable System or Satellite System. User receives downloads from them and sends information back to the hub using RPS.

None of the existing wireless solutions address the problems associated with distance limit and number of users that can be served but the current invention not only address all of the problems associated with wireless systems but also solves it very efficiently. WDCS can be designed that can operate at any frequency between 2 GHz to 40 GHz. It can be best suited for the FCC' proposed the super-set HIPERLAN UNII in the 300Mhz spectrum at 5.15-5.25Ghz (can be used for CPE), 5.25-5.35Ghz (Can be used for Collectors/Repeaters), and 5.725-5.825Ghz (Can be used for Hubs) with a power of 200mW, 1 Watt, and 4 Watts, respectively.

PTO/SB/09 (12-97)
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STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(b))–INDEPENDENT INVENTOR	Docket Number (Optional)

Applicant, Patentee, or Identifier: Sanjay H. Patel

Application or Patent No.: Application (Provisional)

Filed or Issued: 01-16-2002

Title: Wireless Distribution & collection System

As a below named inventor, I hereby state that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees to the Patent and Trademark Office described in:

- [X] the specification filed herewith with title as listed above.
- [X] the application identified above.
- [ ] the patent identified above.

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Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- [X] No such person, concern, or organization exists.
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Separate statements are required from each named person, concern, or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

Sanjay H. Patel	Harrish S. Patel	
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
S.H.Patel	H.S. Patel	
Signature of inventor	Signature of inventor	Signature of inventor
01-16-2002	01-16-2002	
Date	Date	Date

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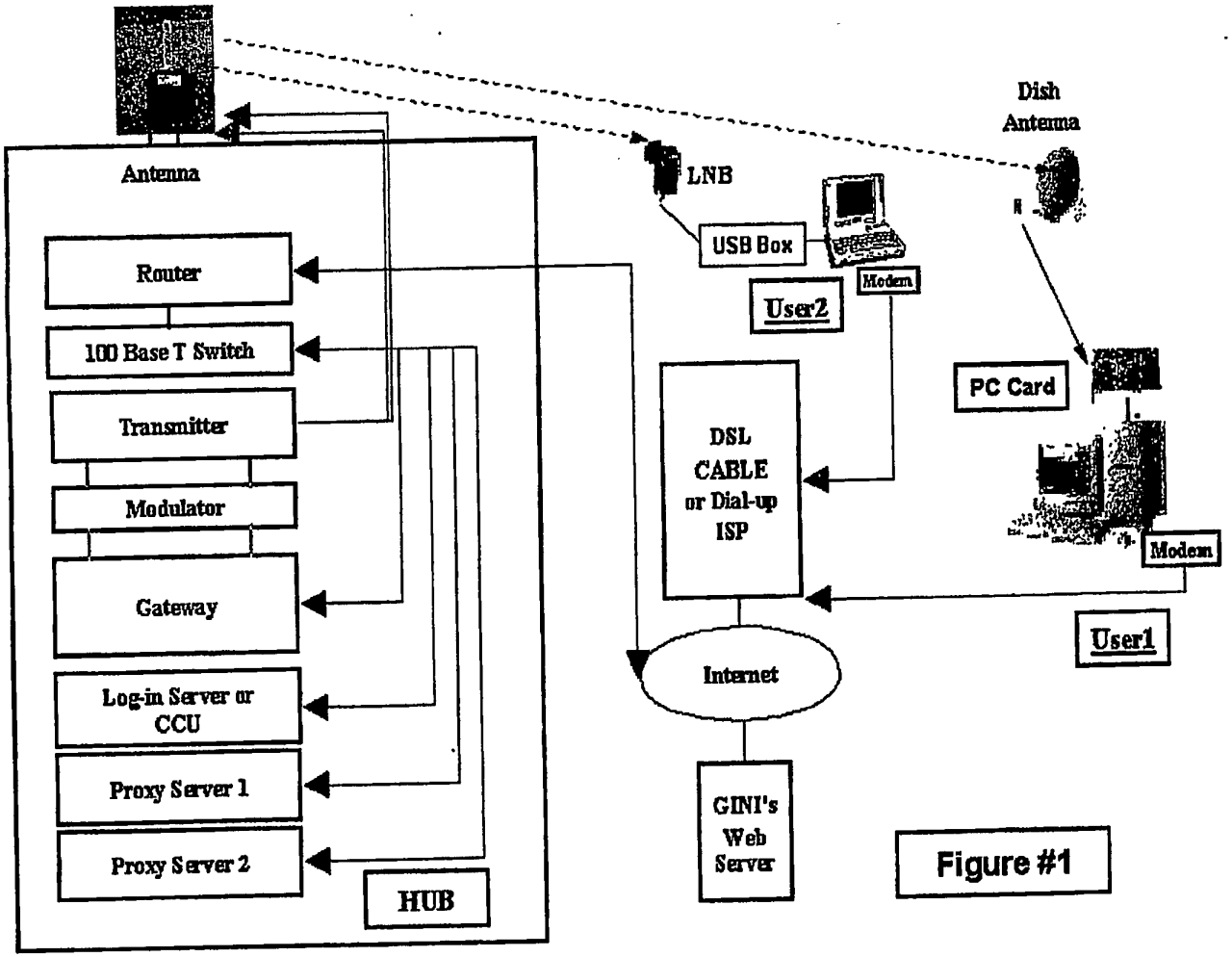
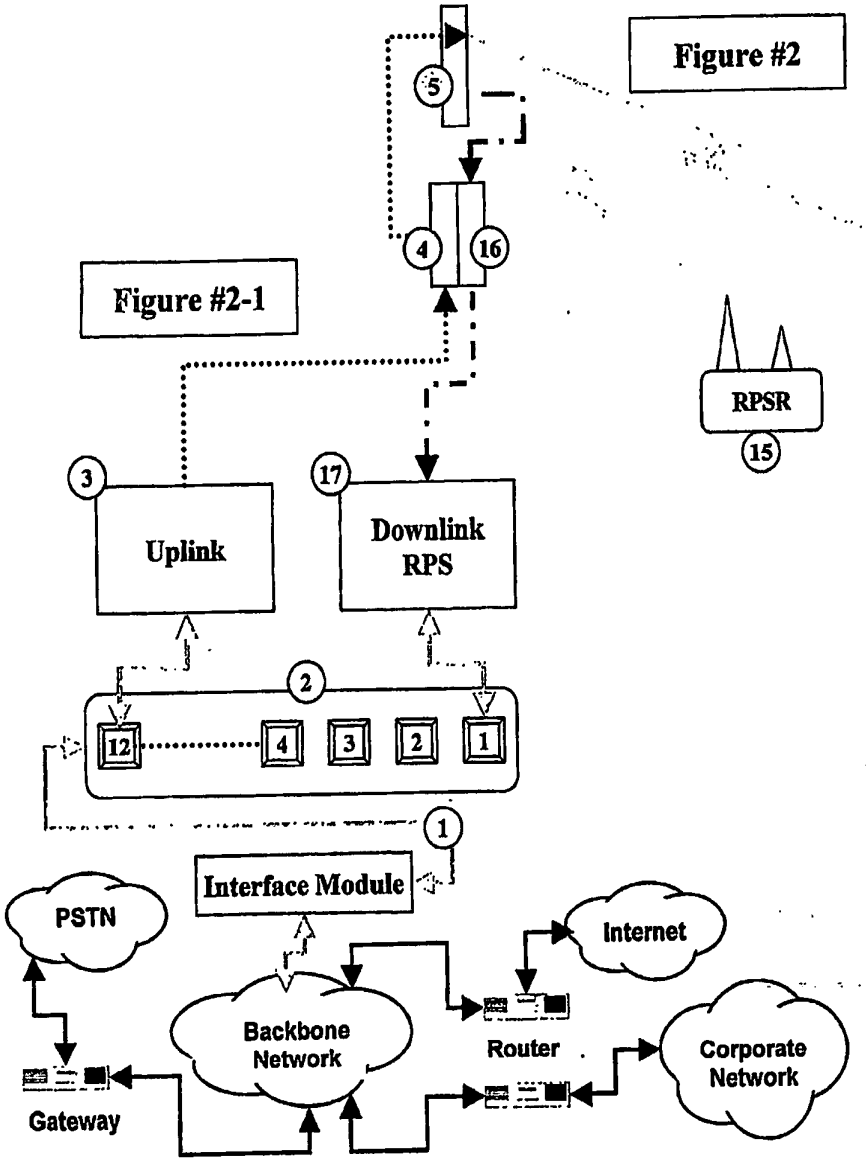
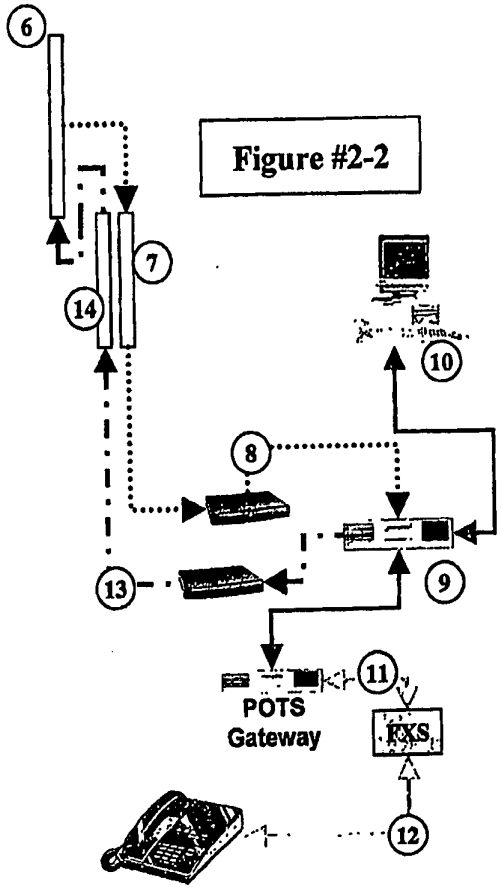


Figure #1

Figure #2


5
4
16
Figure #2-1
RPSR
15
3
Uplink
17
Downlink
RPS
2
12
4
3
2
1
1
Interface Module
PSTN
Internet
Backbone
Network
Router
Corporate
Network
Gateway


6
Figure #2-2
7
14
10
8
13
9
11
POTS
Gateway
FXS
12

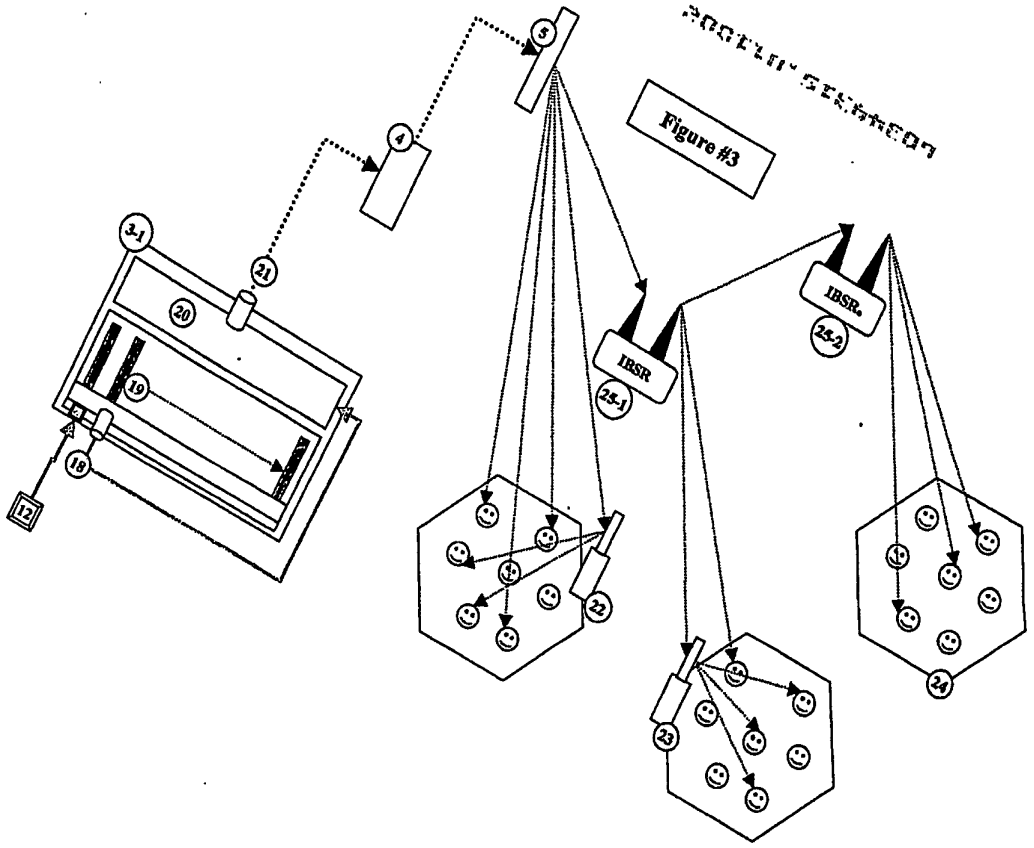


Figure #3
IBSR
IBSR
3-1
4
5
12
18
19
20
21
22
23
24
25-1
25-2

Figure #4

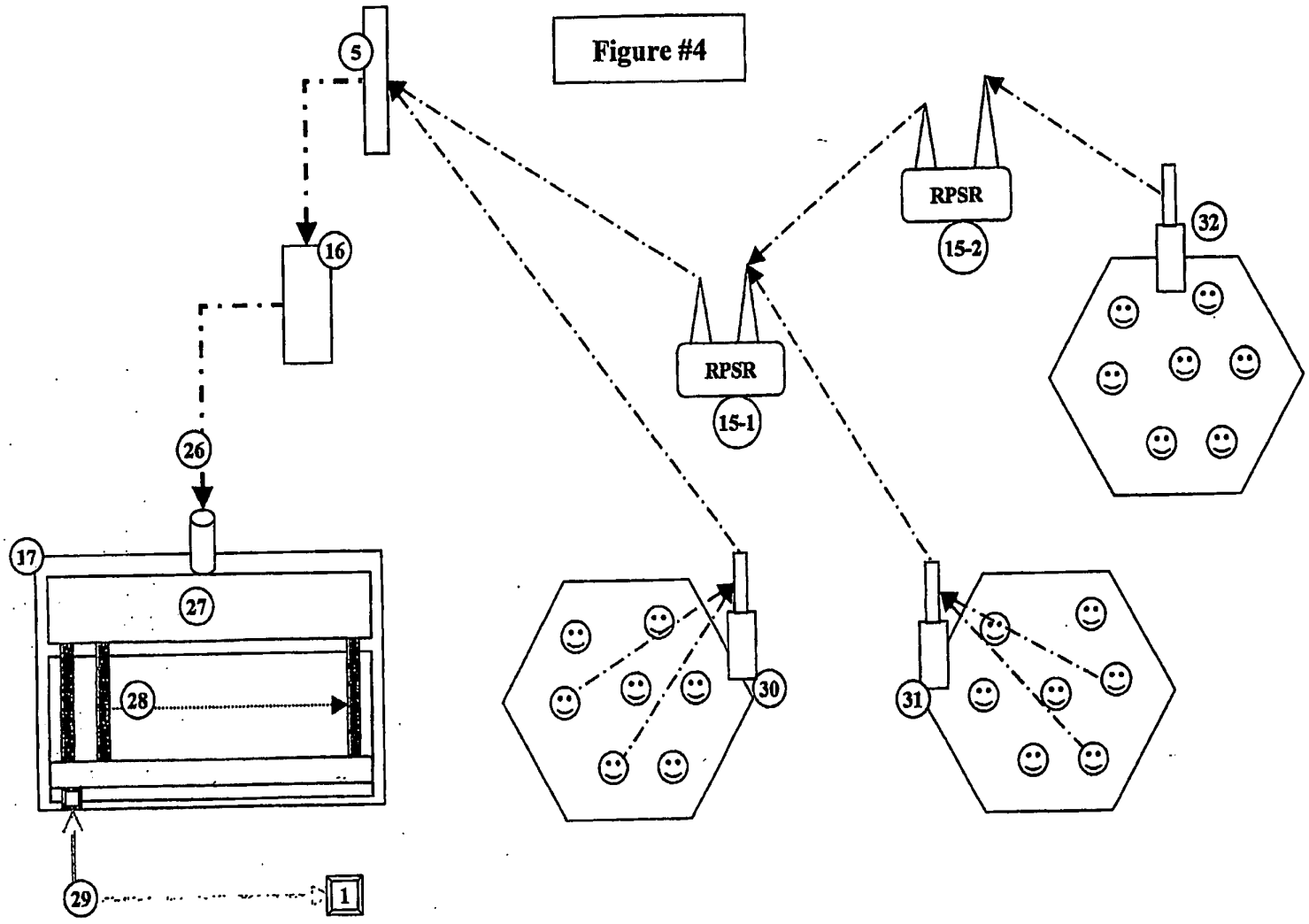
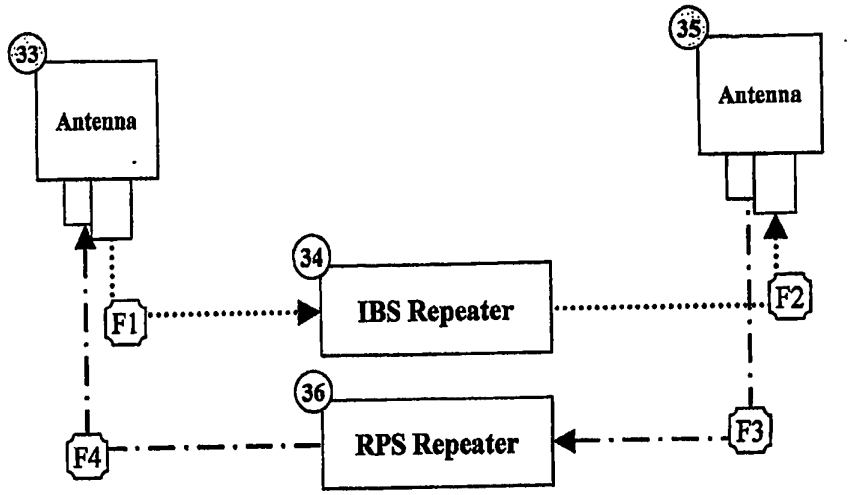
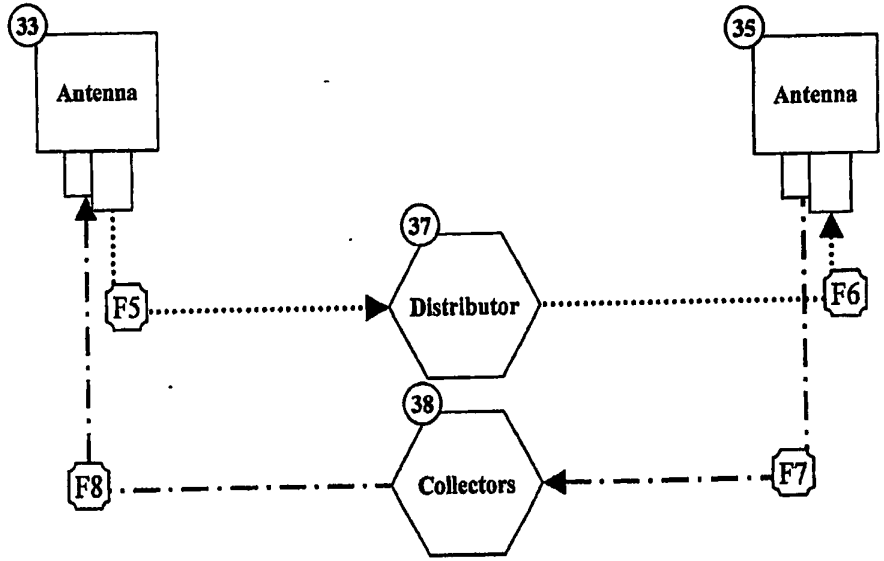


Figure #5

Figure #6





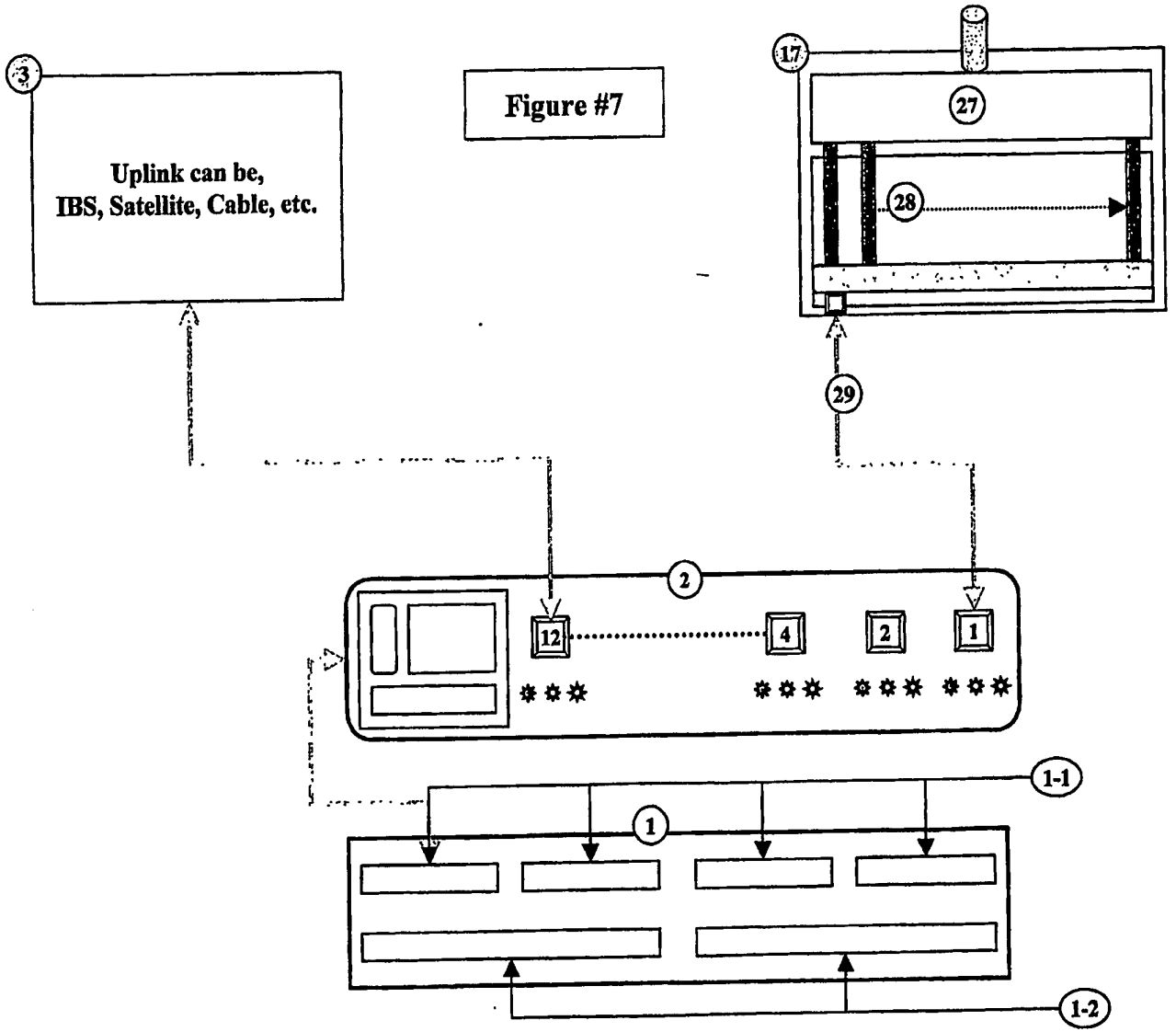

3
Uplink can be,
IBS, Satellite, Cable, etc.
17
27
28
29
2
12
4
2
1
1-1
1
1-2

Figure #7